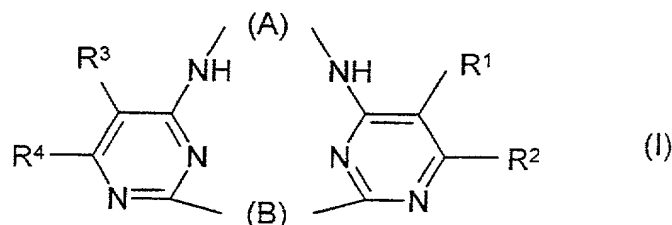


## CLAIMS:

1. A 2,4-bridged bis-4-amino-pyrimidine derivative represented by the general Formula I,



wherein

A and B, independently of each other, represent a linking group having a chain length comprising of from 1 to 20 separate bonds; and

$R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$ , independently of each other, represent

hydrogen, halogen, alkyl, alkenyl, alkynyl, cycloalkyl, amino, trihalogenmethyl, nitro, cyano, or a group of the formula  $-OR'$ ,  $-SR'$ ,  $-R'OR''$ ,  $-R'SR''$ ,  $-C(O)R'$ ,  $-C(S)R'$ ,  $-C(O)OR'$ ,  $-C(S)OR'$ ,  $-C(O)SR'$ ,  $-C(S)SR'$ ,  $-C(O)NR'(OR'')$ ,  $-C(S)NR'(OR'')$ ,  $-C(O)NR'(SR'')$ ,  $-C(S)NR'(SR'')$ ,  $-CH(CN)_2$ ,  $-C(O)NR'_2$ ,  $-C(S)NR'_2$ ,  $-CH[C(O)R']_2$ ,  $-CH[C(S)R']_2$ ,  $-CH[C(O)OR']_2$ ,  $-CH[C(S)OR']_2$ ,  $-CH[C(O)SR']_2$ ,  $-CH[C(S)SR']_2$ ,  $CH_2OR'$ ,  $CH_2SR'$ , or  $-SO_2NR'R''$ ; or

a partially or completely saturated mono- or polycyclic carbocyclic group, a mono- or poly-cyclic heterocyclic group, an aralkyl group, or a hetero-alkyl group, which mono- or polycyclic groups or aralkyl or hetero-alkyl groups may optionally be substituted one or more times with substituents selected from the group consisting of

halogen, trihalogenmethyl, alkyl, alkenyl, alkynyl, amino, nitro, cyano, or amido, or a group of the formula  $-R'$ ,  $-OR'$ ,  $-SR'$ ,  $-R'OR''$ ,  $-R'SR''$ ,  $-C(O)R'$ ,  $-C(S)R'$ ,  $-C(O)OR'$ ,  $-C(S)OR'$ ,  $-C(O)SR'$ , or  $-C(S)SR'$ ; or

a phenyl or a phenoxy group, which phenyl or phenoxy groups may optionally be substituted on or more times with substituents selected from the group consisting of halogen, trihalogenmethyl, alkyl, alkenyl, alkynyl, amino, nitro,

cyano, or amido, or a group of the formula  $-R'$ ,  $-OR'$ ,  $-SR'$ ,  $-R'OR''$ ,  $-R'SR''$ ,  $-C(O)R'$ ,  $-C(S)R'$ ,  $-C(O)OR'$ ,  $-C(S)OR'$ ,  $-C(O)SR'$ , or  $-C(S)SR'$ ; or

$R^1$  and  $R^2$  together, and/or  $R^3$  and  $R^4$  together, form a partially or completely saturated mono- or polycyclic carbocyclic group, or a mono- or poly-cyclic heterocyclic group, which mono- or polycyclic groups may optionally be substituted one or more times with substituents selected from the group consisting of

halogen, trihalogenmethyl, alkyl, alkenyl, alkynyl, amino, nitro, cyano, or amido, or a group of the formula  $-R'$ ,  $-OR'$ ,  $-SR'$ ,  $-R'OR''$ ,  $-R'SR''$ ,  $-C(O)R'$ ,  $-C(S)R'$ ,  $-C(O)OR'$ ,  $-C(S)OR'$ ,  $-C(O)SR'$ , or  $-C(S)SR'$ ; or

a phenyl or a phenoxy group, which phenyl or phenoxy groups may optionally be substituted on or more times with substituents selected from the group consisting of halogen, trihalogenmethyl, alkyl, alkenyl, alkynyl, amino, nitro, cyano, or amido, or a group of the formula  $-R'$ ,  $-OR'$ ,  $-SR'$ ,  $-R'OR''$ ,  $-R'SR''$ ,  $-C(O)R'$ ,  $-C(S)R'$ ,  $-C(O)OR'$ ,  $-C(S)OR'$ ,  $-C(O)SR'$ , or  $-C(S)SR'$ ;

wherein  $R'$  and  $R''$ , independently of each another, represent hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, alkoxy or alkoxyalkyl, or a group of the formula  $NR'''R''''$ , wherein  $R'''$  and  $R''''$ , independently of each another, represent hydrogen or an alkyl group.

2. The bridged amino-pyrimidine derivative of claim 1, wherein A and B, independently of each another, represent

a linear or branched alkylene chain having of from 1 to 15 carbon atoms, which alkylene group may be interrupted by one or more oxygen or sulphur atoms, or by one or more groups of the formula  $-NR'''$ -, or  $=NR'''$ , wherein  $R'''$  represents hydrogen or alkyl; or

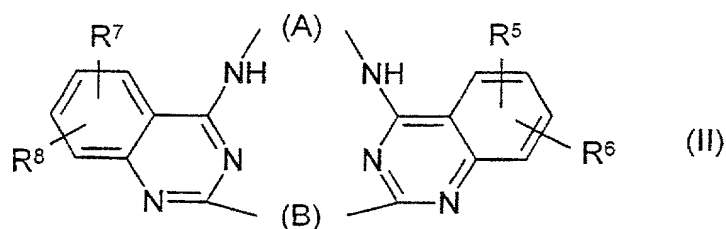
a di-radical of the formula  $-(CH_2)_a-D-(CH_2)_b-$ , wherein a and b, which may be identical or different, represent the number 0, 1, 2, 3, 4 or 5, and D represents a cycloalkyl group, or an aryl group of from 6 to 12 carbon atoms, which aryl group may in particular be a phenyl group or a biphenyl group.

3. The bridged amino-pyrimidine derivative of claim 2, wherein A and B, independently of each another, represent

decamethylene; octamethylene; hexamethylene; pentamethylene; tetramethylene; trimethylene; dimethylene; N,N'-dimethyl-diamino-methylene; N,N'-dimethyl-diamino-dimethylene; N,N'-dimethyl-diamino-trimethylene; (cis and/or trans)-1,5-cyclooctylene; (cis and/or trans)-1,3-dimethylcyclohexane- $\alpha,\alpha'$ -

diyl; para-xylene- $\alpha,\alpha'$ -diyl; meta-xylene- $\alpha,\alpha'$ -diyl; 1,3-phenylene; biphenyl-3,3'-diyl; 4,4'-dimethyl-bibenzyl- $\alpha,\alpha'$ -diyl; 4,4'-dimethyl-diphenylmethane- $\alpha,\alpha'$ -diyl; 4,4'-dimethyl-cis/trans-stilbene- $\alpha,\alpha'$ -diyl; 2,6-bis(4'-methyl-phenyl)pyridine- $\alpha,\alpha'$ -diyl; 3,3'-dimethyl-biphenyl- $\alpha,\alpha'$ -diyl; or 2,7-dimethyl-9H-fluorene- $\alpha,\alpha'$ -diyl.

4. The bridged amino-pyrimidine derivative of claim 1, which is a 2,4-bridged bis-4-amino-quinazoline derivative represented by the general Formula II,



wherein

A and B, independently of each another, represent a linear or branched alkylene chain having of from 1 to 15 carbon atoms, which alkylene group may be interrupted by one or more oxygen or sulphur atoms, or by one or more groups of the formula  $-NR'''$ -, or  $=NR'''$ -, wherein  $R'''$  represents hydrogen or alkyl; or

a di-radical of the formula  $-(CH_2)_a-D-(CH_2)_b-$ , wherein a and b, which may be identical or different, represent the number 0, 1, 2, 3, 4 or 5, and D represents a cycloalkyl group, or an aryl group of from 6 to 12 carbon atoms, which aryl group may in particular be a phenyl group or a biphenyl group; and

$R^5$ ,  $R^6$ ,  $R^7$  and  $R^8$ , independently of each another, represent hydrogen, halogen, trihalogenmethyl, alkyl, alkenyl, alkynyl, amino, nitro, cyano, or amido, or a group of the formula  $-R'$ ,  $-OR'$ ,  $-SR'$ ,  $-R'OR''$ ,  $-R'SR''$ ,  $-C(O)R'$ ,  $-C(S)R'$ ,  $-C(O)OR'$ ,  $-C(S)OR'$ ,  $-C(O)SR'$ , or  $-C(S)SR'$ ; or

a phenyl or a phenoxy group, which phenyl or phenoxy groups may optionally be substituted on or more times with substituents selected from the group consisting of halogen, trihalogenmethyl, alkyl, alkenyl, alkynyl, amino, nitro, cyano, or amido, or a group of the formula  $-R'$ ,  $-OR'$ ,  $-SR'$ ,  $-R'OR''$ ,  $-R'SR''$ ,  $-C(O)R'$ ,  $-C(S)R'$ ,  $-C(O)OR'$ ,  $-C(S)OR'$ ,  $-C(O)SR'$ , or  $-C(S)SR'$ ;

wherein  $R'$  and  $R''$ , independently of each another, represent hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, alkoxy or alkoxyalkyl, or a group of the formula

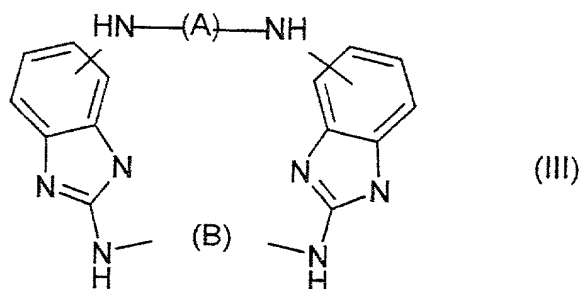
NR'''R''', wherein R''' and R''', independently of each another, represent hydrogen or alkyl.

5. The bridged amino-quinazoline derivative of claim 4, wherein A and B, independently of each another, represent

decamethylene; octamethylene; hexamethylene; pentamethylene; tetramethylene; trimethylene; dimethylene; N,N'-dimethyl-diamino-methylene; N,N'-dimethyl-diamino-dimethylene; N,N'-dimethyl-diamino-trimethylene; (cis and/or trans)-1,5-cyclooctylene; (cis and/or trans)-1,3-dimethylcyclohexane- $\alpha,\alpha'$ -diyl; para-xylene- $\alpha,\alpha'$ -diyl; meta-xylene- $\alpha,\alpha'$ -diyl; 1,3-phenylene; biphenyl-3,3'-diyl; 4,4'-dimethyl-bibenzyl- $\alpha,\alpha'$ -diyl; 4,4'-dimethyl-diphenylmethane- $\alpha,\alpha'$ -diyl; 4,4'-dimethyl-cis/trans-stilbene- $\alpha,\alpha'$ -diyl; 2,6-bis(4'-methyl-phenyl)pyridine- $\alpha,\alpha'$ -diyl; 3,3'-dimethyl-biphenyl- $\alpha,\alpha'$ -diyl; or 2,7-dimethyl-9H-fluorene- $\alpha,\alpha'$ -diyl.

6. The bridged amino-quinazoline derivative of claim 4, being 20,23-dimethyl-2,10,18,20,23,25,32,33-octaazahexacyclo [22.7.1.1<sup>4,8</sup>.1<sup>11,19</sup>.0<sup>12,17</sup>.0<sup>26,31</sup>] tetratriaconta-1(32),11,13,15,17,19(33),24,26,28,30-decaene.

7. A bridged bis-2-amino-benzimidazole derivative represented by the general Formula III,



wherein

A and B, independently of each another, represent a linking group having a chain length comprising of from 1 to 20 separate bonds.

8. The bridged amino-benzimidazole derivative of claim 7, wherein A and B, independently of each another, represent

a linear or branched alkylene chain having of from 1 to 15 carbon atoms, which alkylene group may be interrupted by one or more oxygen or sulphur atoms, or

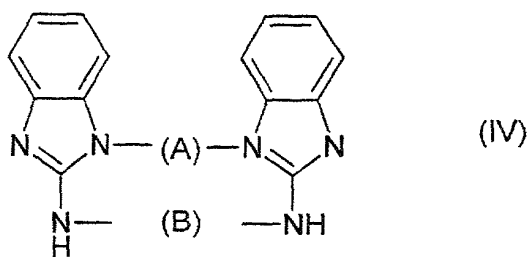
by one or more groups of the formula  $-NR'''$ -, or  $=NR'''$ , wherein  $R'''$  represents hydrogen or alkyl; or

a di-radical of the formula  $-(CH_2)_a-D-(CH_2)_b-$ , wherein a and b, which may be identical or different, represent the number 0, 1, 2, 3, 4 or 5, and D represents a cycloalkyl group, or an aryl group of from 6 to 12 carbon atoms, which aryl group may in particular be a phenyl group or a biphenyl group

9. The bridged amino-benzimidazole derivative of claim 7, wherein A and B, independently of each another, represent

decamethylene; octamethylene; hexamethylene; pentamethylene; tetramethylene; trimethylene; dimethylene; N,N'-dimethyl-diamino-methylene; N,N'-dimethyl-diamino-dimethylene; N,N'-dimethyl-diamino-trimethylene; (cis and/or trans)-1,5-cyclooctylene; (cis and/or trans)-1,3-dimethylcyclohexane- $\alpha,\alpha'$ -diyl; para-xylene- $\alpha,\alpha'$ -diyl; meta-xylene- $\alpha,\alpha'$ -diyl; 1,3-phenylene; biphenyl-3,3'-diyl; 4,4'-dimethyl-bibenzyl- $\alpha,\alpha'$ -diyl; 4,4'-dimethyl-diphenylmethane- $\alpha,\alpha'$ -diyl; 4,4'-dimethyl-cis/trans-stilbene- $\alpha,\alpha'$ -diyl; 2,6-bis(4'-methyl-phenyl)pyridine- $\alpha,\alpha'$ -diyl; 3,3'-dimethyl-biphenyl- $\alpha,\alpha'$ -diyl; or 2,7-dimethyl-9H-fluorene- $\alpha,\alpha'$ -diyl.

10. A bridged bis-2-amino-benzimidazole derivative represented by the general Formula IV,



wherein

A and B, independently of each another, represent a linking group having a chain length comprising of from 1 to 20 separate bonds.

11. The bridged amino-benzimidazole derivative of claim 10, wherein A and B, independently of each another, represent

a linear or branched alkylene chain having of from 1 to 15 carbon atoms, which alkylene group may be interrupted by one or more oxygen or sulphur

atoms, or by one or more groups of the formula  $-NR'''$ -, or  $=NR'''$ , wherein  $R'''$  represents hydrogen or alkyl; or

a di-radical of the formula  $-(CH_2)_a-D-(CH_2)_b-$ , wherein a and b, which may be identical or different, represent the number 0, 1, 2, 3, 4 or 5, and D represents a cycloalkyl group, or an aryl group of from 6 to 12 carbon atoms, which aryl group may in particular be a phenyl group or a biphenyl group

12. The bridged amino-benzimidazole derivative of claim 10, wherein A and B, independently of each another, represent

decamethylene; octamethylene; hexamethylene; pentamethylene; tetramethylene; trimethylene; dimethylene; N,N'-dimethyl-diamino-methylene; N,N'-dimethyl-diamino-dimethylene; N,N'-dimethyl-diamino-trimethylene; (cis and/or trans)-1,5-cyclooctylene; (cis and/or trans)-1,3-dimethylcyclohexane- $\alpha,\alpha'$ -diyl; para-xylene- $\alpha,\alpha'$ -diyl; meta-xylene- $\alpha,\alpha'$ -diyl; 1,3-phenylene; biphenyl-3,3'-diyl; 4,4'-dimethyl-bibenzyl- $\alpha,\alpha'$ -diyl; 4,4'-dimethyl-diphenylmethane- $\alpha,\alpha'$ -diyl; 4,4'-dimethyl-cis/trans-stilbene- $\alpha,\alpha'$ -diyl; 2,6-bis(4'-methyl-phenyl)pyridine- $\alpha,\alpha'$ -diyl; 3,3'-dimethyl-biphenyl- $\alpha,\alpha'$ -diyl; or 2,7-dimethyl-9H-fluorene- $\alpha,\alpha'$ -diyl.

13. A chemical compound according to any of claims 1-12, for use as a medicament.

14. The use of a chemical compound according to any of claims 1-12 for the manufacture of a medicament for the treatment, prevention or alleviation of a disease or a disorder or a condition of a mammal, including a human, which disease, disorder or condition is associated with the activity of potassium channels.

15. The use according to claim 14, wherein the disease or disorder is asthma, cystic fibrosis, chronic obstructive pulmonary disease and rhinorrhea, convulsions, vascular spasms, coronary artery spasms, renal disorders, polycystic kidney disease, bladder spasms, urinary incontinence, bladder outflow obstruction, irritable bowel syndrome, gastrointestinal dysfunction, secretory diarrhoea, ischaemia, cerebral ischaemia, ischaemic heart disease, angina pectoris, coronary heart disease, traumatic brain injury, psychosis, anxiety, depression, dementia, memory and attention deficits, Alzheimer's disease, dysmenorrhea, narcolepsy, Reynaud's disease, intermittent claudication, Sjorgren's syndrome, migraine, arrhythmia, hypertension, absence seizures, myotonic muscle dystrophy, xerostomi, diabetes type II, hyperinsulinemia, premature labour, baldness, cancer, and immune suppression.

16. A pharmaceutical composition comprising a therapeutically-effective amount of a chemical compound according to any of claims 1-12, or a pharmaceutically-acceptable addition salt thereof, together with at least one pharmaceutically-acceptable carrier or diluent.

5

17. A method of treatment, prevention or alleviation of a disease or a disorder or a condition of a living animal body, including a human, which disease, disorder or condition is responsive to blockade of the potassium channel, and which method comprises administering to such a living animal body, including a human, in need thereof a therapeutically-effective amount of a compound of any of claims 1-12.

10

18. The method according to claim 17, wherein the disease or disorder or condition is asthma, cystic fibrosis, chronic obstructive pulmonary disease and rhinorrhea, convulsions, vascular spasms, coronary artery spasms, renal disorders, polycystic kidney disease, bladder spasms, urinary incontinence, bladder outflow obstruction, irritable bowel syndrome, gastrointestinal dysfunction, secretory diarrhoea, ischaemia, cerebral ischaemia, ischaemic heart disease, angina pectoris, coronary heart disease, traumatic brain injury, psychosis, anxiety, depression, dementia, memory and attention deficits, Alzheimer's disease, dysmenorrhea, narcolepsy, Reynaud's disease, intermittent claudication, Sjorgren's syndrome, migraine, arrhythmia, hypertension, absence seizures, myotonic muscle dystrophia, xerostomi, diabetes type II, hyperinsulinemia, premature labour, baldness, cancer, and immune suppression.

15

20

10029168 132801